

## REMARKS

Claims 1, 3-11, 13-18, 20-22, and 35-46, 48-58, 60-63, and 65 were previously presented. Claims 2, 12, 19, 23-34, 47, and 59 are cancelled. Claims 64, 66, and 67 are currently amended. New claims 68-70 are added. Accordingly, claims 1, 3-11, 13-18, 20-22, and 35-46, 48-58, and 60-70 are pending in the application.

### 1. Objection to Drawings

The Applicant has attached drawings that are each identified in the top margin as “Replacement Sheet.”

### 2. Rejection of Independent Claims 1 and 60 under 35USC§102

Independent Claims 1 and 60 each stand rejected under 35USC§102 as being anticipated by U.S. Patent Number 5,627,928 (Matsuura). In particular, Figure 6 of Matsuura is cited against these claims.

Claims 1 and 60 each recites “multi-mode waveguides positioned on a base, the waveguides including input waveguides, transition waveguides, and an output waveguide.” Additionally, these claims also recite that “the waveguides intersecting one another.” As a result, Matsuura must teach input waveguides, transition waveguides, and output waveguide that intersect one another.

Figure 6 of Matsuura shows interconnection of a plurality of branching devices. The illustrated branching devices are constructed according to Matsuura’s Figure 4 (C4, L36-39 and C16, L3-6). Figure 4 teaches a first waveguide core member 10, a second waveguide core member 20, and a third waveguide core member 21. These waveguide core members do not intersect as is evident from Figure 4 itself. In fact, Matsuura’s Summary states the following:

In summary, in the optical branching device according to the present invention,  
(a) first (waveguide) core member has (a) first edge face ..., (a) second  
(waveguide) core member has the second edge face facing the first edge face **at**  
**a given space**, and (a) third (waveguide) core member has a third edge face  
facing the first edge face **at a given space** (C2, L39-47, emphasis added).

Accordingly, Matsuura teaches that the first waveguide core, the second waveguide core, and the third waveguide core are spaced apart from one another. See also the Abstract which describes this relationship as “isolated.” As a result, Figure 6 of Matsuura teaches interconnection of branching devices that each has waveguides that do not intersect one another.

The Office Action analogizes the tapered waveguides shown in Matsuura’s Figure 6 (labeled reference number 10 in Figure 4) as the claimed waveguides. However, since the cited waveguides come together in accordance with Figure 4 and the waveguides of Figure 4 do not intersect, the cited waveguides do not intersect one another as claimed. For this reason alone, Matsuura does not anticipate claims 1 and 60.

### 3. Rejection of Independent Claims 18 and 62 under 35USC§102

Independent Claims 18 and 62 each stand rejected under 35USC§102 as being anticipated by Matsuura. In particular, Figure 6 of Matsuura is cited against these claims.

The intersection argument raised above with respect to claims 1 and 60 also apply to these claims. For this reason alone, claims 1 and 60 are not anticipated by Matsuura.

Additionally, claims 18 and 62 each recites “the output waveguide including an **expansion** taper configured to expand the width of a light signal traveling along the output waveguide after having traveled through an input waveguide.” The claimed expansion taper is different from the contraction taper recited in claims 1 and 60. This difference is written into the claim itself with the language “expand the width of a light signal ... **after having traveled through an input waveguide.**”

Even when Matsuura’s waveguides are defined as set forth in the Office Action, Matsuura does not teach the claimed expansion taper. For instance, a light signal traveling through the cited output waveguide **after traveling through any one of cited input waveguides** is contracted and is not expanded.

Even when Matsuura’s device is operated in the reverse direction, Matsuura still does not provide the required teaching. For instance, suppose that the cited output waveguide now serves as a hypothetical input waveguide, each of the cited input waveguides serve as a hypothetical output waveguide, and each of the cited transition waveguides serve as a hypothetical transition waveguide. However, none of the hypothetical output waveguides can be the claimed output waveguides since the hypothetical transition waveguides do not combine light signals from

multiple hypothetical input waveguides onto one of the hypothetical output waveguides as claimed.

Since Matsuura does not teach or suggest an “output waveguide including an **expansion** taper configured to expand the width of a light signal traveling along the output waveguide after having traveled through an input waveguide,” claims 18 and 62 are patentable over Matsuura.

#### 4. Rejection of Independent Claim 37 under 35USC§103

Independent Claim 37 stands rejected under 35USC§103 as being unpatentable over Matsuura. This rejection relies on Matsuura being applied to claim 37 in the same manner as to claims 1 and 60. Accordingly, the same arguments presented above for the patentability of claims 1 and 60 apply to this rejection. For instance, Matsuura does not teach or suggest input waveguides, transition waveguides, and output waveguide that intersect one another as recited in claim 37.

#### 5. Rejection of Independent Claim 53 under 35USC§103

Independent Claim 53 stands rejected under 35USC§103 as being unpatentable over Matsuura. This rejection relies on Matsuura being applied to claim 53 in the same manner as to claims 18 and 62. Accordingly, the same arguments presented above for the patentability of claims 18 and 62 apply to this rejection. For instance, Matsuura does not teach or suggest input waveguides, transition waveguides, and output waveguide that intersect one another as recited in claim 53. For this reason alone, claim 53 is patentable over Matsuura. Further, Matsuura does not teach or suggest an output waveguide including an **expansion** taper configured to expand the width of a light signal traveling along the output waveguide after having traveled through an input waveguide. For this reason alone, claim 53 is patentable over Matsuura.

#### 6. Claims 3-11, 13-17, 20-22, and 35-36, 38-46, 48-52, 54-58, 61, and 63-70

Each of claims 3-11, 13-17, 20-22, and 35-36, 38-46, 48-52, 54-58, 61, and 63-70 depends from Independent Claim 1, 18, 37, 52, 60, or 62. Since the Independent Claims are believed to be in condition for allowance, claim 3-11, 13-17, 20-22, and 35-36, 38-46, 48-52, 54-58, 61, and 63-70 are also believed to be in condition for allowance.

#### 7. Future Prosecution

For the purposes of Appeal, the Applicant provides the following document. At this time, the Applicant makes no representation regarding the contents of these submissions.

1. Webster's New World College Dictionary, 4th ed., pp 747 (2006).

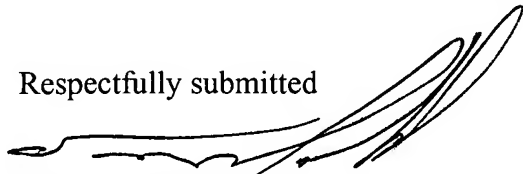
## CONCLUSION

In light of the Claim amendments presented above, Applicants believe they are entitled to a letters patent. The Examiner is encouraged to telephone the undersigned with any questions.

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Respectfully submitted



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**interphone** *n.* an intercommunication telephone system of an office

**interplanar** *adj.* 1 between planets 2 but outside the atmosphere of any planet

**interplay** *n.* action, effect, or one another; interaction —*vi.* to exert

**interplead** *vi.* —*plead'* or —*plead'* (-pled') or (Anglo-Fr *entrepleder*; see INTER- & PLEAD) to plead

**interpleader** *n.* (Anglo-Fr *entrepleder*, to interplead; sublegal procedure by which two or more parties to a lawsuit or property may be compelled to resolve themselves in a single action rather than proceed against the party holding the disputed money

**international** *adj.* [inter(national) + police] an international organization with headquarters in Paris; it coordinates the participating nations against international crime

**international police** *n.* [inter(national) + police] an international organization with headquarters in Paris; it coordinates the participating nations against international crime

**interpolate** *vt.* —*lat'*ed, —*lat'*ing [*<* L *interpolare*, to polish, dress up, corrupt *<* *interpolare*, to repair *<* *inter-*, between + *polire*, to polish, to corrupt (a book or manuscript, etc.) by inserting subject matter, etc. 2 to insert between or into a text 3 *Math.* (functional value) by taking a weighted average of values at neighboring points, as in estimating intermediate value on a table, esp. a metric table —*vi.* to make interpolations — *inter-pol-a'tor* —*inter-pol-a'tion* *n.* —*inter-pol-a'tor*

**interpose** *vt.* —*posed'*, —*pos'*ing [*<* Fr *poser*; see POSER] *<* L *interpositus*, pp. of *interponere*, to put between + *ponere*, to put, place: to put between; insert 2 to introduce by putting forward as interference 3 to introduce (a subject) into a conversation, debate, etc.: put in as an obstacle or come between 2 to intervene or mediate —*inter-pos'al* *n.* —*inter-pos'er* *n.*

**interposition** *n.* [ME *interposicion* *<* OFr *interpositio* *<* pp. of *interponere*; see prec.] 1 an act of interposing 2 a thing interposed 3 the distance between two things 4 the act of interposing

**interpreter** *n.* [ME *interpreten* *<* MFr *interpréter* *<* L *interpretari*, agent between two parties, broker, interpreter: the meaning of; make understandable (to) 2 to translate (esp. oral remarks) 3 to have or understand the meaning of; construe (to) 4 to bring out the meaning of; to translate (a work of art), as in performance 5 to translate (a program in a high-level language and execute it, statement by statement) —*vi.* to act as an interpreter; to explain —*inter-pret-a'ble* *adj.*

**interpretation** *n.* [ME *interpretacion* *<* L *interpretatio*] 1 the act or result of interpreting; meaning, translation, exposition, etc. 2 the person's conception of a work of art, subject, etc. 3 a writing, writing, criticizing, etc. / the pianist's interpretation —*inter-pret-a'tional* *adj.*

**interpretative** *adj.* [ME *interpretativus* *<* L *interpretativus*] 1 of or relating to interpretation 2 of or relating to interpretation

**interpreter** *n.* [ME *interpretour* *<* Anglo-Fr *<* OFr *interpretator*] 1 a person who interprets; one whose work is translating a foreign language between people speaking different languages 2 a program that translates and executes, statement by statement, a program written in a high-level language

**interpreter** *adj.* 1 that interprets; explanatory 2 of or relating to interpretation 3 of or relating to interpretation

**interplay** *adj.* between, among, or involving interplay; also 'inter-pace'

**interplay** *adj.* situated between rays or radii — *inter-play*

**interval** *n.*, *pl.* —*reg'*-nums or —*reg'*-na (-nə) *<* *regnum*, REIGN] 1 an interval between two events when the country has no sovereign 2 a suspension of administrative functions; period without government, etc. 3 any break in a series or in a sequence

**interlat** *vt.*, *vi.* —*lat'*ed, —*lat'*ing to make, to be mutually related —*inter-re-lat'*ed *adj.*

**interrelationship** *n.* mutual relationship; interconnection; relationship

**interreligious** *adj.* between or among religions, religions, or sects

**interregnum** *n.*, *pl.* —*reg'*-ges' (-rē'jēz') [*<* *inter-*, between + *regis*, king; see REGAL] a person acting as a regent

**interrogation** *n.* [INTERROGATION MARK] + BANG! an exclamation mark (!) a punctuation mark (!) a symbol of disbelief, etc.

**interrogate** (in ter'a gāt') *vt.* —*gat'*ed, —*gat'*ing [*<* L *interrogatus*, pp. of *interrogare*, to ask *<* *inter-*, between + *rogare*, to ask; see ROGATION] to ask questions of formally in examining / to interrogate a witness / —*vi.* to ask questions —*SYN.* ASK

**interrogation** (in ter'a gāt'shən) *n.* [ME *interrogacion* *<* MFr *interrogation* *<* L *interrogatio*] 1 an interrogating or being interrogated: examination 2 a question 3 [Now Rare] short for INTERROGATION MARK

**interrogation mark** (or point) QUESTION MARK

**interrogative** (in ter'a gāt'iv) *adj.* [LL *interrogativus* see INTERROGATE] 1 asking, or having the form of, a question 2 used in a question —*n.* an interrogative word or expression (Ex.: what? where?) —*inter-rog'a-tive* *adv.*

**interrogator** (in ter'a gāt'or) *n.* 1 a person who interrogates: questioner 2 a radio or radar transmitter whose signals actuate a transponder or a beacon

**interrogatory** (in ter'a gāt'orē) *adj.* [LL *interrogatorius*] expressing or implying a question —*n.* *pl.* —*ries* a formal question or set of questions; specif., a written question or set of questions to be answered in writing under oath as by a witness in a lawsuit — *inter-rog'a-to-rily* *adv.*

**interrupt** (in ter'rupt') *vt.* [ME *interrupten* *<* L *interruptus*, pp. of *interrumpere*, to break apart, break off *<* *inter-*, between + *rumpere*, to break; see RUPTURE] 1 a) to break into or in upon (a discussion, train of thought, etc.) b) to break in upon (a person) who is speaking, working, etc.: stop or hinder 2 to make a break in the continuity of; cut off; obstruct —*vi.* to make an interruption, esp. in another's speech, action, etc. —*inter-rupt'*ive *adj.*

**interrupted** *adj.* 1 broken by interruption; not continuous 2 Bot. asymmetrical; irregular: said of parts not equally spaced on a stem

**interrupted screw** a screw having the thread interrupted by a slot or slots to enable it to be locked or released by a partial turn

**interrupter** (-or) *n.* 1 a person or thing that interrupts 2 Elec. a mechanism for intermittently opening and closing a circuit

**interruption** (in ter'rup'shən) *n.* [ME *interruption* *<* OFr *<* L *interruptio*] 1 an interrupting or being interrupted 2 anything that interrupts 3 the interval during which something is interrupted; intermission

**interscholastic** (in ter'skə las'tik) *adj.* between or among schools / an interscholastic debate

**intersect** (in ter'sekt') *vt.* [*<* L *intersectus*, pp. of *intersecare*, to cut between, cut off *<* *inter-*, between + *secare*, to cut; see SAW<sup>2</sup>] to divide into two parts by passing through or across; cut across / a river intersects the plain / —*vi.* to cross each other / lines intersecting to form right angles

**intersection** (in ter'sek'shən, in ter'sek'shən) *n.* [L *intersectio*] 1 the act of intersecting 2 a place of intersecting; specif., a) the point or line where two lines or surfaces meet or cross, b) the place where two or more roads meet or, esp., cross 3 *Math.* the set containing all the points common to two or more given sets

**inter-sectional** (in ter'sek'shənəl) *adj.* 1 of or forming an intersection 2 between sections or regions / inter-sectional games

**inter-service** (in ter'ser'vis, in ter'ser') *adj.* between or among branches of the armed forces

**inter-session** (in ter'sesh'ən) *n.* a short session, usually a month long, between regular sessions of a college year, in which the student concentrates on a specialized project

**inter-sex** (in ter'seks') *n.* Biol. an abnormal individual having characteristics intermediate between those of male and female

**intersexual** (in ter'sek'shənəl) *adj.* 1 between the sexes / intersexual rivalry 2 of, or having the characteristics of, an intersex

**inter-space** (in ter'spās; for *v.* in ter'spās, in ter'spās') *n.* a space between —*vt.* —*spaced'*, —*spac'*ing 1 to make spaces between 2 to fill spaces between

**inter-specific** (in ter'spā sif'ik) *adj.* between species

**inter-spersion** (in ter'spurs') *vt.* —*spersed'*, —*spers'*ing [*<* L *interspersus*, pp. of *interspergere* *<* *inter-*, among + *spargere*, to scatter; see SPARK<sup>1</sup>] 1 to scatter among other things; put here and there or at intervals 2 to decorate or diversify with things scattered here and there —*inter-sper'sion* (-spurs'hən, -zhən) *n.*

**interstadial** (in ter'stād'ēəl) *adj.* of a relatively warm period during a glacial epoch, when glaciers temporarily stop or retreat

**inter-state** (in ter'stāt') *adj.* between or among states esp. of the U.S. / interstate commerce —*n.* one of a network of U.S. highways connecting the 48 contiguous states

**Interstate Commerce Commission** a federal commission created in 1887 to regulate commerce among the states; it has eleven members, appointed by the President

**interstellar** (in ter'stel'or, in ter'stel'or) *adj.* [INTER- + STELLAR] between or among the stars / interstellar space

**interstice** (in ter'stis) *n.*, *pl.* —*stices* (-stē siz, -sēz') [*<* Fr *<* LL *interstitium* *<* *inter-*, between + *sistere*, to set, redupl. of *stare*, to STAND] a small or narrow space between things or parts; crevice

**interstitial** (in ter'stish'ēəl) *adj.* 1 of, forming, or occurring in interstices 2 Anat. situated between the cellular components of an organ or structure —*inter-sti'tially* *adv.*

**intertestamental** (in ter'tes'ta ment'l) *adj.* of or pertaining to the period of Jewish literature between the writing of the last testament and the coming of Jesus

See the inside front cover for pronunciation information.

The symbol \* is used to mark terms of American origin.